Homework Questions (10.9)

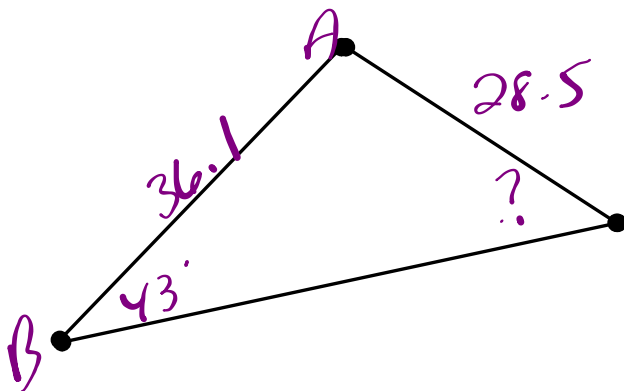1b)

unknown

$$\frac{\textcircled{a}}{\sin A} = \frac{b}{\sin B}$$

$$\frac{d^{\sin 53°}}{\sin 53°} = \frac{32.5 \sin 53}{\sin 49°}$$

$$d = 34.39$$

A

53°

b = 32.5

49°   78

B

d

a

F

2a)

A

28.5

36.1

?

43°

C

B
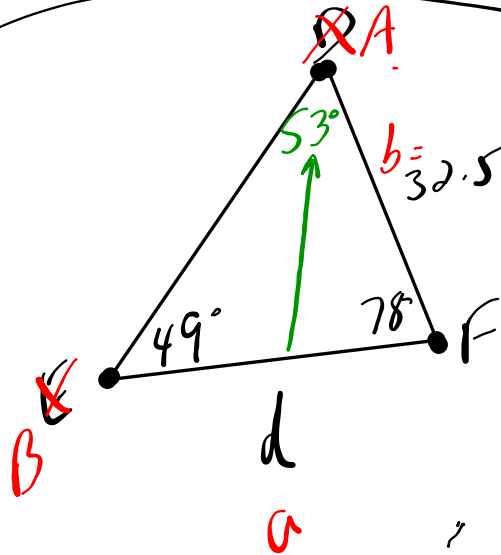
$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

$$\frac{\sin C}{36.1} = \frac{\sin 43°}{28.5}$$

$$\sin^{-1} \sin C = \sin^{-1}(0.8639)$$
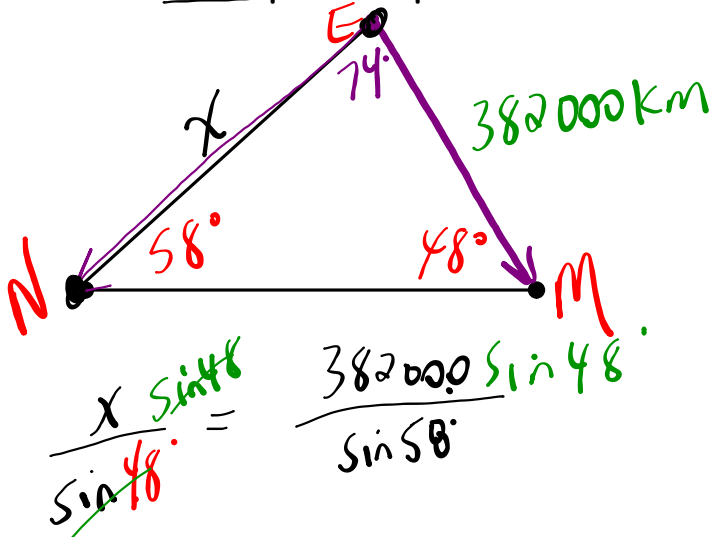
$$\angle C = 60°$$

WARM-UP...

Ask yourself...

1. What am I given?
2. What am I trying to find?

EXAMPLE...

On a space flight, astronant Neil Armstrong reports that the angle formed by his lines of sight to the earth and to the moon was 58⁰. At the same time, the observer on the earth reports that the angle formed by her lines of sight to the spaceship and to the moon is 74⁰. If the moon is 382 000 km from the earth, how far is the spaceship from the tracking station?

E

74°

x   382 000 km

N   58°   48°   M

$$\frac{x \sin 48°}{\sin 48°} = \frac{382\,000 \sin 48°}{\sin 58°}$$

$$X = \frac{382000\sin(48)}{\sin(58)}$$

334746.7256

$$x = 334\,746.7\,km$$

EXAMPLE #4 - Application

Suppose that Mr. Watters was playing a straight par-3 golf hole that was 120 m long. He hits one of his regular old slices that ends up 40° off line and is still 82 m from the hole.

(a) How far did his tee shot travel?

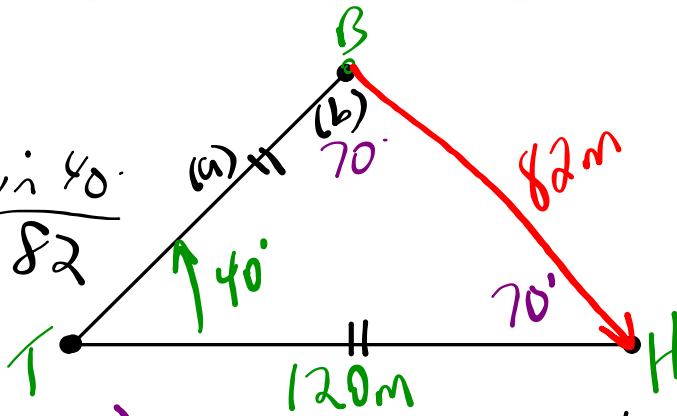(b) If he somehow miraculously hits his next shot onto the green, what was the angle between the path of his first shot and the path followed by the second shot?

① Angles...

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

b)

$$\frac{120 \sin B}{120} = \frac{120 \sin 40}{82}$$

$$\sin B = (0.9407)$$

$$\boxed{B = 70°}$$

(a) 70°   (b) 70°

82 m

40°

T ⊢⊢ 120m H

a) 120 m

$$\frac{a \sin 70}{\sin 70} = \frac{82 \sin 70°}{\sin 40}$$ OR

$$\boxed{a = 120 \, m}$$

$$\frac{a \sin 70}{\sin 70} = \frac{120 \sin 70°}{\sin 70}$$

$$a = 120$$

Law of Cosines

Derivation of the law of cosines...
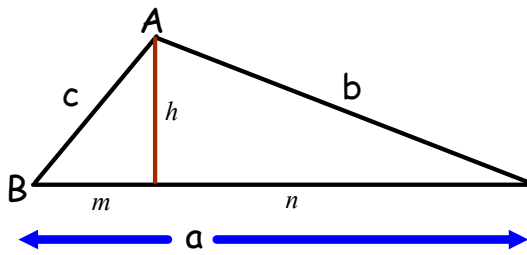
$$c^2 = h^2 + m^2 \longleftarrow m = a - n$$

$$c^2 = h^2 + (a-n)^2$$

$$c^2 = h^2 + a^2 - 2an + n^2$$

$$c^2 = h^2 + n^2 + a^2 - 2an \longleftarrow h^2 + n^2 = b^2$$

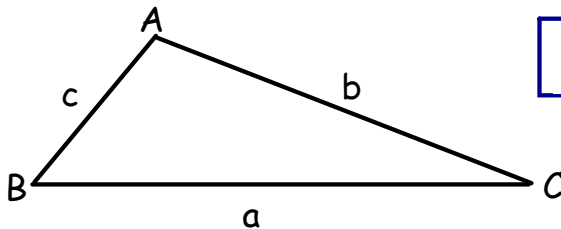$$c^2 = b^2 + a^2 - 2an \longleftarrow \cos C = \frac{n}{b}$$

$$n = b \cos C$$

$$c^2 = a^2 + b^2 - 2a(b \cos C)$$

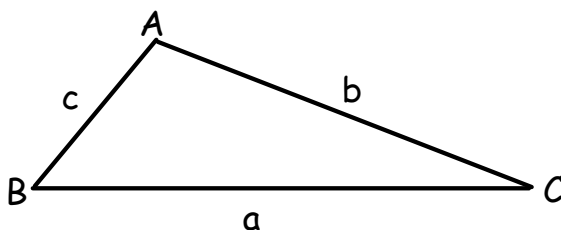$$\boxed{c^2 = a^2 + b^2 - 2ab \cos C}$$

Finding an unknown side...
- 2 sides and a contained angle (SAS)

$$\boxed{a^2 = b^2 + c^2 - 2bc \cos A}$$

Finding an unknown angle...
- 3 known sides (SSS)

$$\boxed{\cos A = \frac{b^2 + c^2 - a^2}{2bc}}$$

Homework...

Worksheet - Law of Sines.doc

Weekend

Left Side...

10.9

#1 - 6

Tonight   *10.1Q*

Right Side...

#1 - 4